

Fig. 6

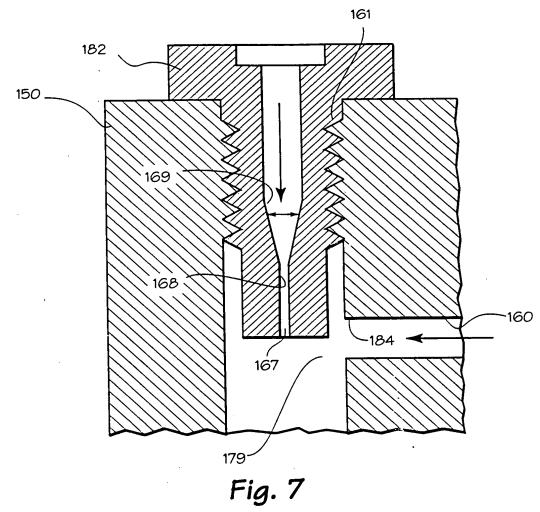


Figure 8 Carbon Black Morphology Map

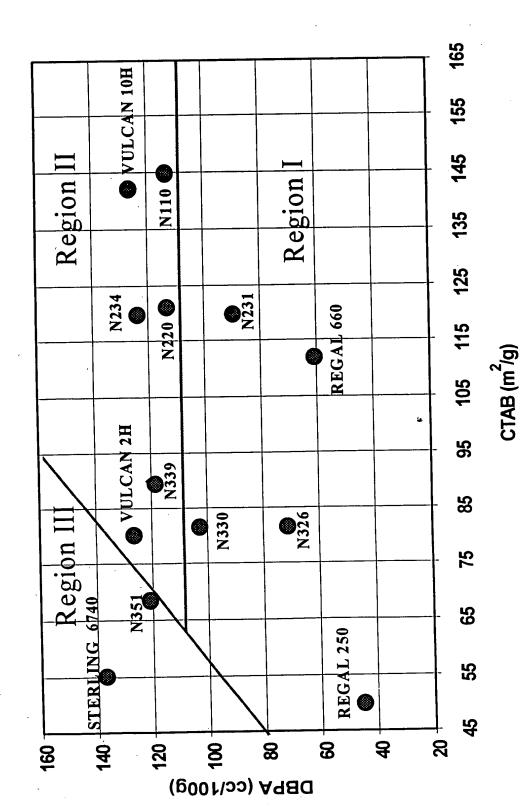


Figure 9 Dispersion Quality and MW sol of NR Masterbatches

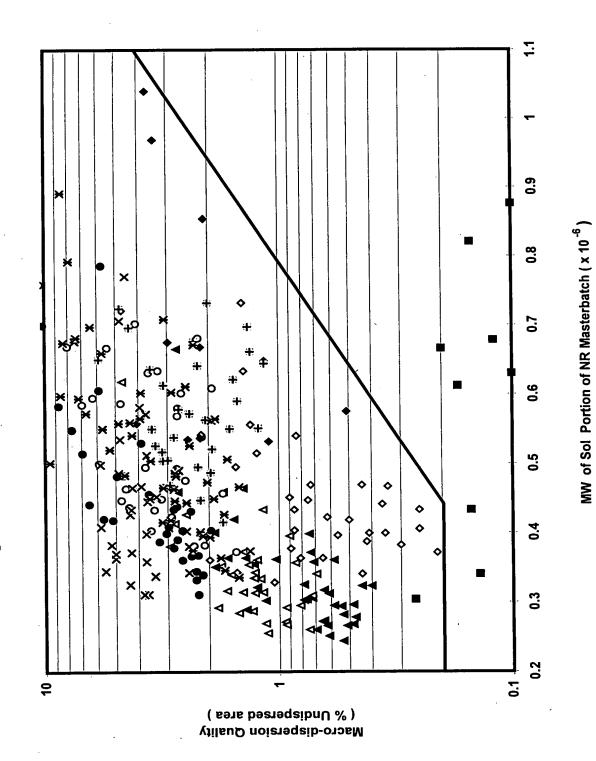
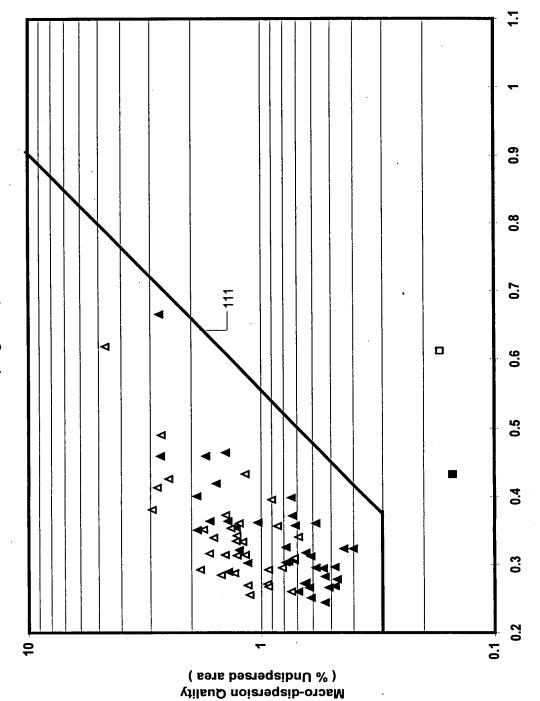


Figure 10 Dispersion Quality and MW sol of NR Masterbatches 6.0 0.8 (Region I) 0.7 :::: 9.0 0.5 0.4 0.3 × 0.5 9 5. ( % Undispersed area ) Macro-dispersion Quality

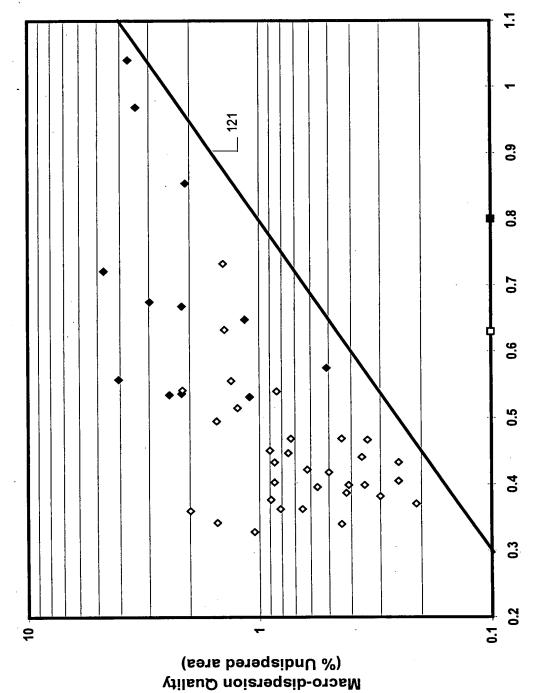
MW of Sol Portion of NR Masterbatch ( x 10 -6)

Figure 11 Dispersion Quality and MW <sub>sol</sub> of NR Masterbatches (*Region II*)



MW of Sol Portion of NR Masterbatch (  $\times\,10^{-6}$  )

Figure 12 Dispersion Quality and MW<sub>sol</sub> of NR Masterbatch (Region III)



MW of Sol portion of NR Masterbatch (x10 -6).

Figure 13 Dispersion Quality and MW <sub>Sol</sub> of NR Masterbatches 0.8 (N330 Carbon Black, 55 phr) 0.7 9.0 0.3 0.2 0.1 ( % Undispersed area) Macro-dispersion Quality

MW of Sol Portion of NR Masterbatch ( x 10 <sup>-6</sup> )

0.9 Figure 14 Dispersion Quality and MW Sol of NR Masterbatches 0.8 MW of Sol Portion of NR Masterbatch ( x 10 <sup>-6</sup> ) (REGAL 250 Carbon Black) 0 0.7 0 0.5 0.4 8 0.3 0.2 10 ( % Undispersed area) Macro-dispersion Quality

Figure 15 Dispersion Quality and MW <sub>Sol</sub> of NR Masterbatches (BLACK PEARL 800 Carbon Black, 55 phr)

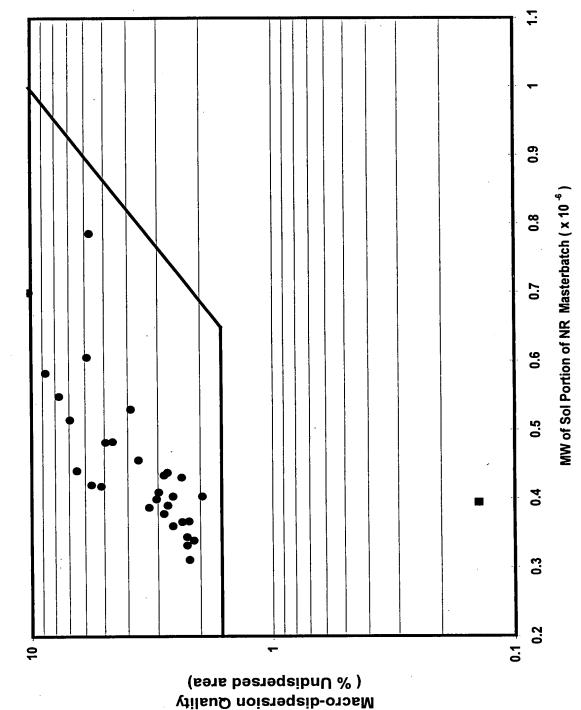
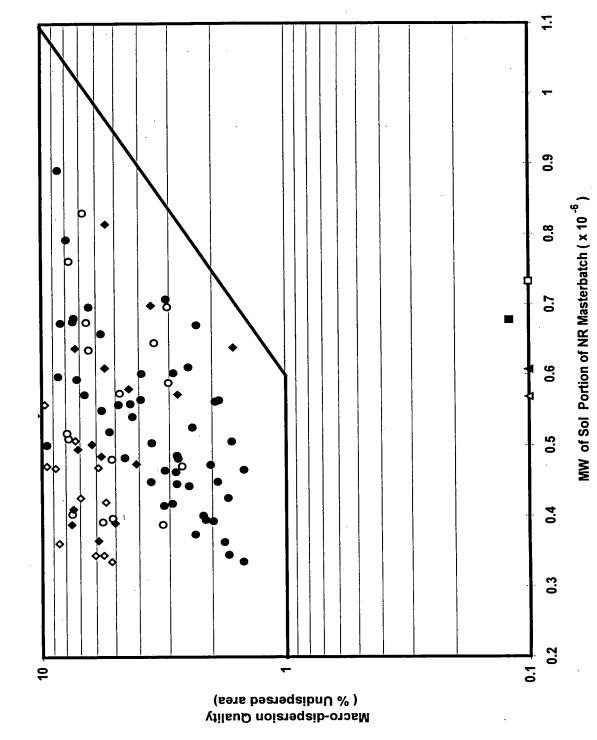
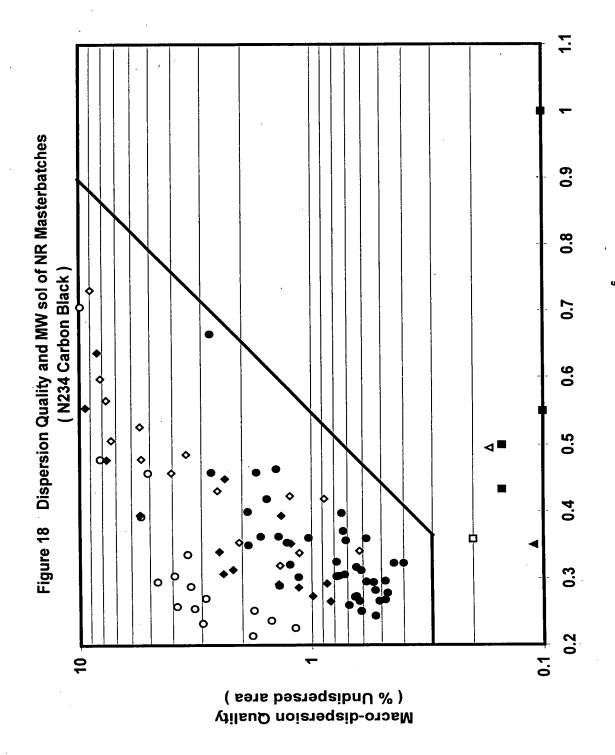


Figure 16 Dispersion Quality and MW Sol of NR Masterbatches 6.0 MW of Sol Portion of NR Masterbatch ( x 10 -6 (N326 Carbon Black, 55 phr) 0.8 0.7 9.0 0.5 0.4 0.3 0.2 ( % Undispersed area) Macro-dispersion Quality

Figure 17 Dispersion Quality and MWSol of NR Masterbatches (REGAL 660 Carbon Black)





MW of Sol Portion of NR Masterbatch (  $\times$  10  $^{-6}$  )

Figure 19 Dispersion Quality and MW Sol of NR Masterbatches 0.9 MW of Sol Portion of NR Masterbatch ( x 10 <sup>-6</sup> ) (N110 Carbon Black, 55 phr) 0.7 9.0 0.4 0.3 0.2 ( % Undispersed area) Macro-dispersion Quality

Figure 20 Dispersion Quality and MW<sub>sol</sub> of NR Masterbatch (N351 Carbon Black, 33 phr.)

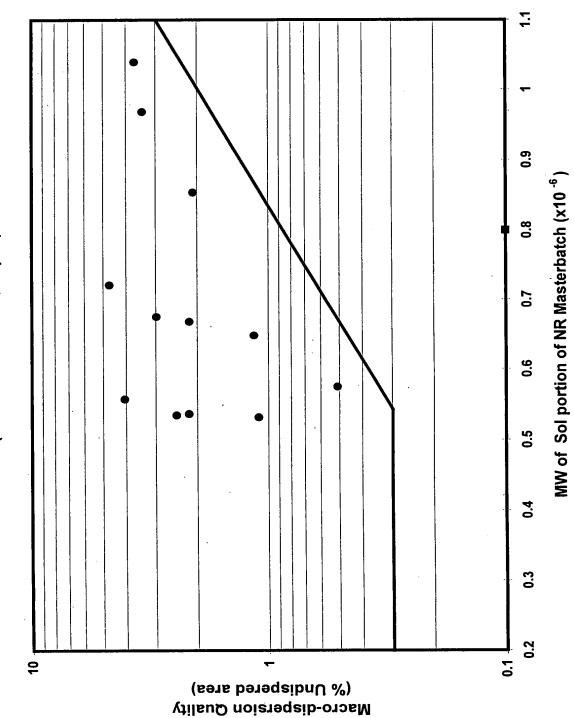


Figure 21 Dispersion Quality and MW Sol of NR Masterbatches 0.9 (STERLING 6740 Carbon Black, 55 phr) 0.7 0.5 0.4 0.3 0.2 ( % Undispersed area) Macro-dispersion Quality

MW of Sol Portion of NR Masterbatch ( x 10 <sup>-6</sup> )

(NR Compounds Containing N234 Carbon Black @ 55 phr Loading) 9.0 MW sol Effect on Crack Growth Rate 0.5 MW sol (x 10 <sup>-6</sup>) 0.3 Figure 22 0.7 က CGR (cm/million cycles)

0.7

(NR Compounds Containing N326 Carbon Black @ 55 phr Loading) 0.7 MW sol Effect on Crack Growth Rate Ø 9.0 MW sol (x 10 <sup>-6</sup>) Figure 23 Crack Growth Rate (cm/million cycles)

(NR Compounds Containing REGAL 660 Carbon Black @ 55 phr Loading) Figure 24 MW sol Effect on Crack Growth Rate 0.8 0.7 MW sol (x 10 <sup>-6</sup>) 0.5 S Crack Growth Rate (cm/million cycles)

8 Max. Tan  $\delta$  (Strain Sweep @ 60°C) of NR Compounds Containing N234 . K 2 93 D) **Black at Different Loadings** Carbon Black Loading (phr) 8 8 **5 4** 9 Figure 25 35 ജ Max. Tan 5 @ 60°C 0.12 0.3 0.28 0.26 0.24 0.16 0.14

Figure 26. Carbon Blacks in NR Compounds for OTR Tread

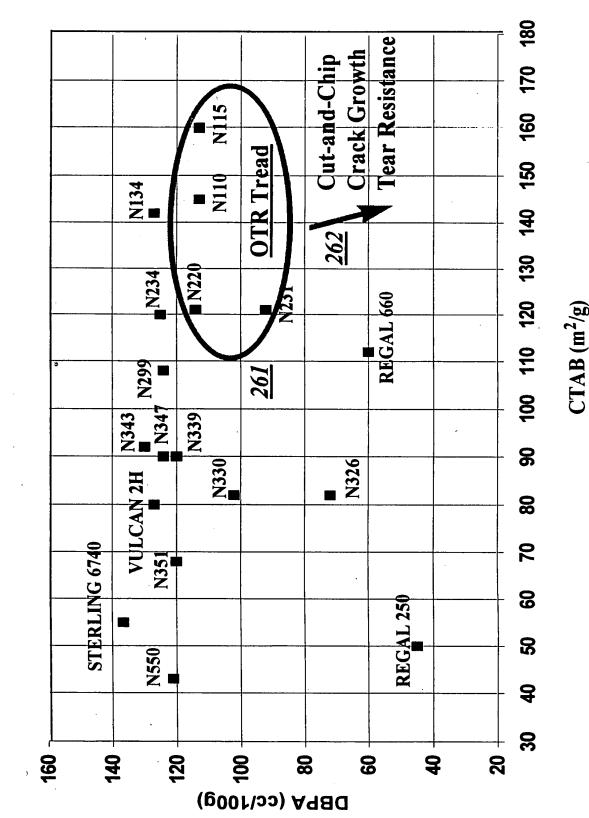


Figure 27. Carbon Blacks in NR Compounds for T/B Tread

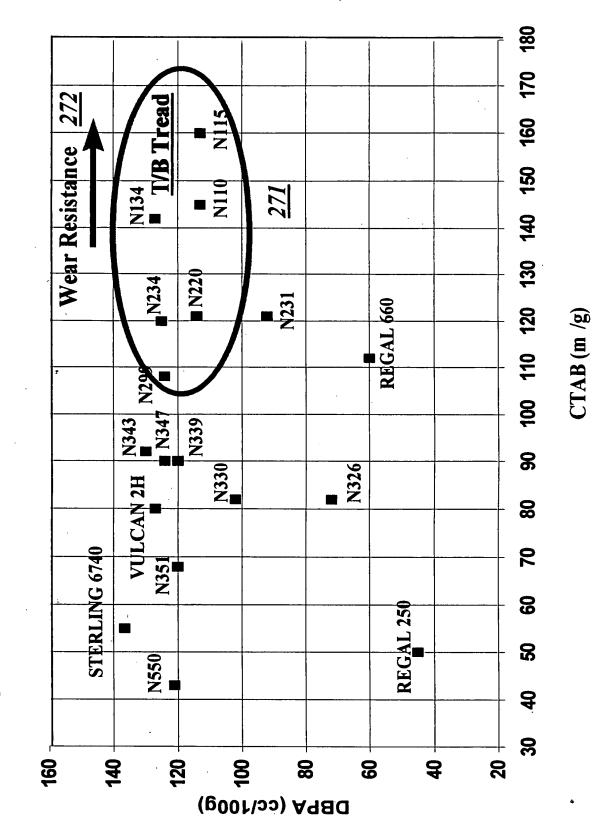
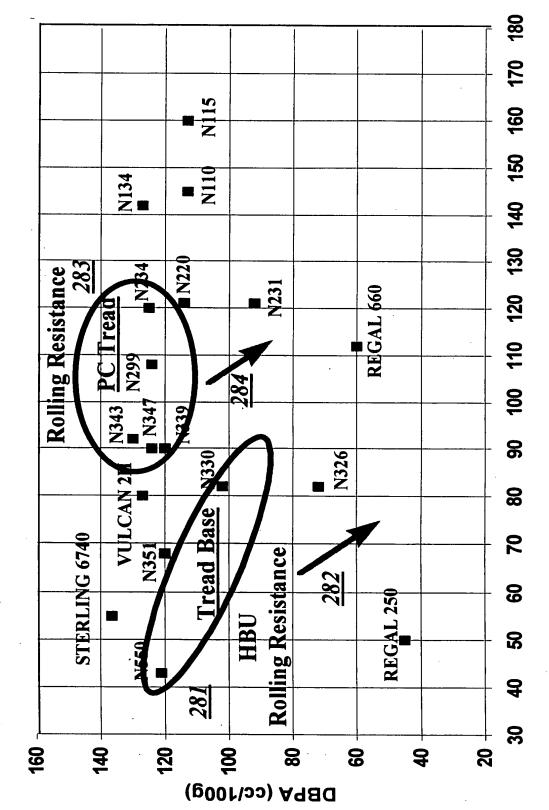


Figure 28 Carbon Blacks in NR Compounds for Tire Applications



CTAB  $(m^2/g)$ 

Figure 29. Carbon Blacks in NR Compounds for Tire Applications

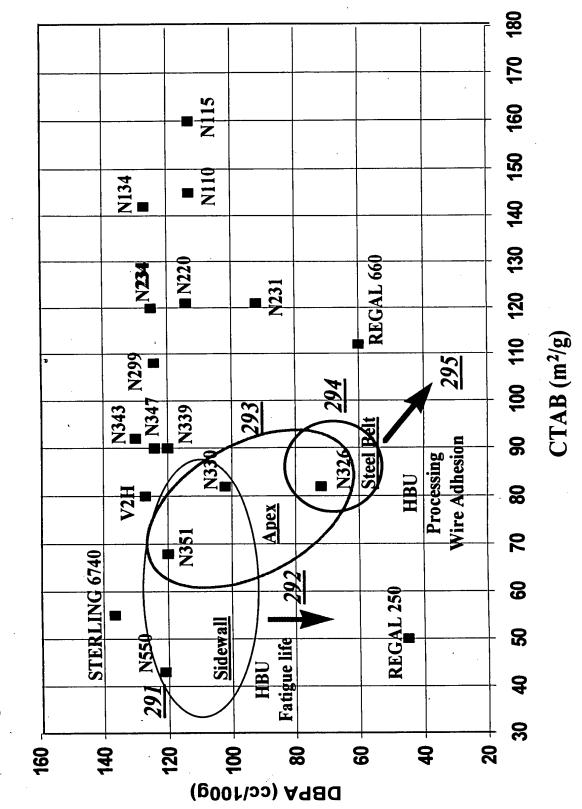


Figure 30 Macro-dispersion Quality and MW of Sol Portion of NR Masterbatch Containing Dual Phase (Carbon Black/Silica) Aggregates 6.0 MW of Sol Portion of NR Masterbatch ( x 10 -6) 0.7 301 0.5 0.4 þ 0 0 0.3 0.2 Macro-dispersion Quality (% Undispersed area) 0.1

Figure 31 Macro-dispersion Quality and MW of Sol Portion of NR Masterbatch Containing Blend of Carbon Black and Silica

